SELECTEST SUPER 50 Mk III

15/DD/01

SEI

INSTRUCTION MANUAL

Description

The Salford Selectest Model 'Super 50' is a self-contained, portable test set for the measurement of ac or dc voltages, currents and resistance. It has been designed to comply with the requirements of the British Standards Specification 89.
The latest instrument techniques have been employed in the design and manufacture to ensure long and satisfactory service under normal working conditions. The critically damped movement employs a stabilized Alcomax III magnet to ensure that life-long first grade accuracy is maintained. An automatic cut-out is provided to protect the instrument against excessive overloads. All components have a safety factor rating of 20 times normal load without damage. The six-inch long eyelash pattern scale is evenly divided and clear presentation enables full use to be made of the instrument accuracy. The knife-edge pointer, used in conjunction with the scale mirror, obviates parallax errors and gives maximum legibility.

Reliability is ensured by the use of a printed circuit for internal electrical connections.

Standard thirty-inch long test leads (total resistance 0·02 ohms) are supplied with spade connectors at one end for connecting to the instrument terminals. The other ends are fitted with removable spring clips which can be replaced by the test prods provided. The test leads may be wound round the handle for temporary storage.

A carrying case for the instrument, with room for the test leads is available as an extra.

General specification

AC voltage ranges: 2·5, 10, 25, 100, 250, 1 000, 2 500 volts.
AC current ranges: 25 mA, 100 mA, 250 mA, 1A, 2·5A, 10 amp.
DC voltage ranges: 250 mV, 2·5, 10, 25, 100, 250, 1 000, 2 500 volts.
DC current ranges: 50 µA, 250 µA, 1 mA, 10 mA, 100 mA, 1A, 2·5A, 10 amp.

The 250 mV range and 50 µA range are common.

Voltage drop on 250 µA range is 150 mV.

Resistance ranges:
(with self-contained batteries)
0–2 000 ohms
(mid-scale reading 20 ohms)
0–200 000 ohms
(mid-scale reading 2 000 ohms)
0–20 Megohms
(mid-scale reading 200 000 ohms)

Accuracy

DC current: ±1% of FSD.

DC voltage: ±1·5% of FSD.

AC voltages and current: ±2·5% of FSD at frequencies within the range 50Hz ±20%.

The variations in indication will not exceed 2·5% of FSD over the following ranges and frequencies:

Ranges	Frequencies
AC voltages	
2 500 V	10 Hz to 1 KHz
1 000 V	10 Hz to 1·5 KHz
250 V	10 Hz to 5 KHz
100 V	10 Hz to 20 KHz
25 V	10 Hz to 20 KHz
10 V	10 Hz to 20 KHz
2·5 V	10 Hz to 5 KHz
AC current	10 Hz to 1·5 KHz

Resistance (with new battery):

±3% from zero to mid-scale reading.
±5% from mid-scale to two-thirds full-scale.
±10% from two-thirds full-scale to full-scale.

Sensitivity

DC voltage ranges: 20 000 ohms per volt or 50µA full-scale deflection.
AC voltage ranges: 2 000 ohms per volt or 500µA full-scale deflection.
2·5 volt ac range: 167 ohms per volt or 6 mA approx. full-scale deflection.
Maximum potential drop on dc current ranges: 250 mV on 50 µA range.
Maximum potential drop on ac current ranges: 720 mV on 25 mA range.

Dimensions

	Centimetres	*Inches*
Length including handle	23	9
Length of case	19·4	7⅝
Width of case	17·8	7
Depth of case	9	3½
Net weight including batteries	2·44 kg	5 lb 6 oz

Batteries

Two replaceable batteries are fitted in the back of the case for resistance measurements.

1–1·5 volt cell:
LPU2.

1–15 volt battery:
Ever Ready type B121.

Suitable battery replacements:

	1·5V	15V
Ever Ready	LPU2	B121
Exide	T21	DH521
Oldham	LP532	—
Siemens	T1-LP	S121
Vidor	V0002	L5541

CUTOUT

The cutout on this instrument is a mechanical device operated by movement of the instrument pointer under overload. It will therefore be ineffective if the instrument pointer does not move i.e. if an A.C. overload is applied to a D.C. Range, or a D.C. overload to an A.C. Range.

The overload capacity of the cutout is limited and if the instrument is to be used on a circuit where the source power is high i.e. a large power transformer, it is advisable to use leads having an H.R.C. fuse in circuit.

TERMINAL SELECTION

Screw heads down tight when using 4mm socket tops.

Table of ranges with switch positions and terminal connections

Ranges	Left-hand dc switch position	Right-hand ac switch position	Terminal connections
DC voltage 250 mV	50 µA	dc	+ and –
DC voltage 2·5, 10, 25, 100, 250, 1 000 volts	Range required	dc	+ and –
DC voltage 2 500	1 000 V	dc	+ and 2 500 V dc
DC current All ranges	Range required	dc	+ and –
AC voltage 2·5, 10, 25, 100, 250, 1 000	ac	Range required	+ and –
AC voltage 2 500	ac	1 000 V	+ and 2 500 V ac
AC current All ranges	ac	Range required	+ and –
Resistance 2 kΩ, 200 kΩ, 20 MΩ	ohms	Range required	+ and –

Operating instructions

To obtain maximum efficiency, the instrument should be used in the horizontal position, but the case has been designed so that readings may be taken in the vertical position if required.

Zero adjustment

Before connecting the instrument in circuit, ensure that the pointer is set to zero on the scale. If not, it may be adjusted by turning the 'zero-adjusting screw' (11).

Range selector switches

The two selector switches, dc (6) and ac (7), can be rotated in either direction to select the desired range. The correct selection position for either switch is indicated within the index circle on the top of each knob. These switches are electrically interlocked to avoid damage through inadvertantly setting the switches incorrectly.

AC readings can only be taken after setting the left-hand switch (6) to the ac position and the right-hand switch (7) to the desired range.

DC readings require the right-hand switch turned to the dc position and the left-hand switch (6) turned to the desired range. When taking any ac or dc measurements in an unknown circuit, the appropriate range selector switch should be set to the highest range before connecting the instrument in circuit. The range can then be progressively reduced until a suitable scale reading is obtained. The switches should **not** be used for switching off circuits by turning to a blank position.

Resistance readings are taken by setting the left-hand switch (6) to the Ω (ohms) position and the right-hand switch (7) to the range desired.

Connect the test leads to terminals + (1) and − (4) and short the open ends together. Adjust the zero adjusting potentiometer (5) until the pointer is on zero at the right-hand side of the bottom scale. The leads may now be connected across the unknown resistance and the value read from the bottom scale.
If the range switch (7), is set to another range, the zero position should be checked by again shorting the test leads and adjusting (5) if necessary, before making a resistance measurement. If it is not possible to adjust the pointer to zero, it is an indication that the batteries are run down and should be replaced.

When used on the resistance ranges, the connections of the internal batteries are such that positive potential appears at the negative terminal (4). Certain components, such as electrolytic condensers, rectifiers and semi-conductors have a variable resistance according to the direction of current flow. When measuring leakage on an electrolytic condenser the negative lead from the instrument should be connected to the positive terminal of the condenser.

Resistance measurements should **NOT** be carried out on any components **in a live circuit.**

Replacing batteries

To replace the batteries, remove the cover on the back of the instrument. Take out old batteries and fit new ones, making sure they are inserted to match the polarity markings on the case. Discharged batteries should **not** be left in the instrument, as possible electrolyte leakage may cause damage. If the instrument is to be stored, unused, for some time, it is recommended that the batteries be removed.

With some batteries the internal resistance can so increase with age that a loss of accuracy can occur on the resistance ranges. If errors are suspected change the old battery for a new one.

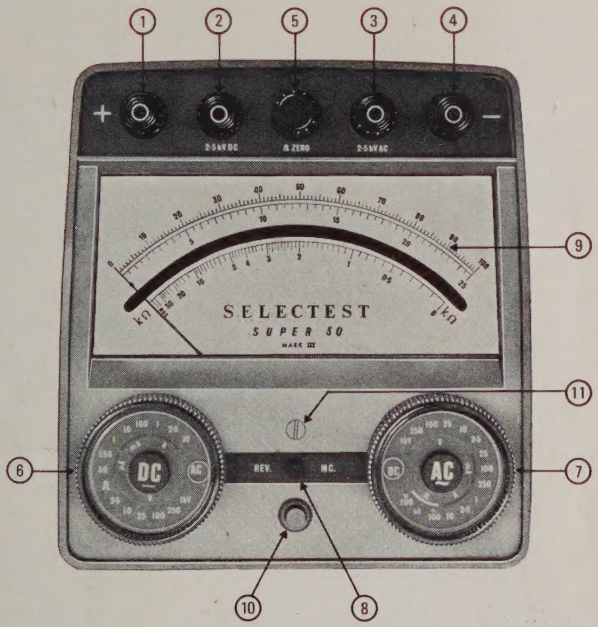
Moving coil reversing switch

The switch (8) is a non-locking push-button type which when depressed, will reverse the polarity of the instrument without the need to change over the leads. This feature assists measurements on dc circuits, the polarity of which is not known.

Automatic cut-out

If an overload is applied to the instrument in a forward or reverse direction, the automatic cut-out operates and breaks the main circuit current. Operation is indicated by the red reset button (10) showing above the front panel. The cut-out is reset by pressing the red button until the catch holds, thus completing the circuit again and making the instrument ready for use.

THE CUT-OUT MUST NOT BE RESET UNTIL THE OVERLOAD HAS BEEN CLEARED.



Terminals

1 Common positive
2 DC volts 2 500
3 AC volts 2 500
4 Negative
5 Zero adjusting potentiometer for resistance measurement

Range Selector Switches

6 DC current and voltage
7 AC current and voltage and resistance
8 Moving coil reversing switch
9 Scale
10 Automatic cut-out reset button
11 Mechanical zero adjusting screw

At the completion of a series of tests, make sure that the range selection switches are not left in the resistance measuring positions. This will prevent the batteries being discharged if the test leads short together.

It will be seen from the instructions that operation of the instrument is simple and will readily become a matter of habit.

Should it become necessary at any time to return the instrument for repair, careful packing will avoid damage in transit.

If you have any instrumentation problems Salford Electrical Instruments engineers are at your service to assist and advise.

Circuit Diagram

● Denotes switch closed

SWITCHES

SW1	S.E.I. Part No. MA 91121	S.7	operated by S.W.2
		S.8	operated by S.W.2
SW2	S.E.I. Part No. MA 91122	S.9	operated by S.W.2
		S.10	operated by S.W.2
S.3	operated by S.W.2	S.11	operated by S.W.1
S.4	operated by S.W.1	S.12	operated by S.W.1
S.5	operated by S.W.1	S.13	operated by S.W.2
S.6	operated by S.W.2	S.14	Reverse M.C.

D.C. SWITCH S.W.1

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	10 A	BLANK	BLANK	A.C.	BLANK	1 kV	250 k	100 V	25 V	10 V	2·5 V	RES	50 µA	250 µA	1 mA	10 mA	100 mA	1 A	2·5 A
S4	●													●	●	●	●	●	
S5														●	●	●	●	●	
S11												●							
S12													●						

A.C. SWITCH S.W.2

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	100 mA	250 mA	1 A	2·5 A	10 A	÷ 100 Ω	× 1 Ω	× 100 Ω	Blank	D.C.	Blank	1 kV	250 V	100 V	25 V	10 V	2·5 V	25 mA
S3						●	●	●										
S6	●	●	●	●	●							●	●	●	●	●	●	●
S7										●								
S8												●	●	●	●	●	●	
S9	●	●	●	●	●							●	●	●	●	●		●
S10	●	●	●	●	●						●						●	●
S13										●								

Component details

REF No.	DESCRIPTION				
	RES (Ω)	TOL	WATTS	TYPE	SUPPLIER
R1	600R	0.5%	¼	4014G	WELWYN
R2	180R	0.5%	¼	4034G	WELWYN
R3	18R	0.5%	¼	4034G	WELWYN
R4	1R8	0.5%		W.W.	S.E.I. LTD. SA 63900/5
R5	R12	0.5%		W.W.	S.E.I. LTD. SA 91847/1
R6	R08	0.5%		W.W.	S.E.I. LTD. SA 91847/2
R7	R016	0.5%		W.W.	S.E.I. LTD. SA 91847/3
R8	15K	0.5%	¼	4034G	WELWYN
R9	30K	0.5%	¼	4034G	WELWYN
R10	150K	0.5%	¼	4034G	WELWYN
R11	300K	0.5%	¼	4034G	WELWYN
R12	1M5	0.5%	1	4036G	WELWYN
R13	3M	0.5%	1	4036G	WELWYN
R14a	4M99	0.5%	1	4036G	WELWYN
R14b	10M	0.5%	1	4036G	WELWYN
R15	30M	0.5%	2	4037G	WELWYN
R16	240R	1%	½	MF.5	WELWYN
R17	300R POT	20%	1.5	P.29	WELWYN
R18	390R	1%	½	MF.5	WELWYN
R19	3K9	1%	½	MF.5	WELWYN
R20	680R	1%	½	MF.5	WELWYN
R21	365R	0.5%	¼	4034G	WELWYN
R22	200R	0.5%	¼	4034G	WELWYN
R23	770R POT	20%	1.5	P.29	WELWYN
R24	1K8	1%	½	MF.5	WELWYN
R25a	10R	1%	½	MF.5	WELWYN
R25b	43R	1%	½	MF.5	WELWYN
R26	11R	1%	½	MF.5	WELWYN
R27	820R	1%	½	MF.5	WELWYN
R28	1K2	1%	½	MF.5	WELWYN
R29	6K8	1%	½	MF.5	WELWYN
R30	196K	1%	½	MF.5	WELWYN
R31	3K3 POT	20%		FTP.21	WELWYN
R32	3M	1%	2	C.25	WELWYN

MISCELLANEOUS

T.1	P.1	10A turn	cu. strip ·006 × ·25
	P.2	2·5A 3 turns	17 s.w.g. cu. wire ·056
	P.3	1A 6 turns	20 s.w.g. cu. wire
	P.4	0·25A 30 turns	26 s.w.g. cu. wire
	P.5	0·1A 60 turns	32 s.w.g. cu. wire
	P.6	0·025A 300 turns	38 s.w.g. cu. wire
	SEC.	2mA 4810 turns	44 s.w.g. cu. wire
B1	15 V cell.		B121
B2	1·5 V leakproof		LPU 2
Z1 Z2	Germanium Diode		OA91 or CG621H
X1	Varite Thermistor		Type KR102CW

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In the event of this instrument requiring recalibration and/or repair it should be returned to Salford Electrical Instruments Ltd., Peel Works, Barton Lane, Eccles, Manchester M30 0HL, ensuring that it is carefully wrapped to avoid damage in transit.

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Printed in England HK&R